

Amendments To The Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing Of Claims

1–19 (canceled)

20. (currently amended): A method of producing linear α -1,4 glucans comprising using a protein having the enzymatic activity of an amylosucrase that is coded for by a DNA molecule comprising a first DNA sequence encoding said protein, wherein said first DNA sequence is ~~is~~ has more than 60% ~~homologous~~ sequence identity to a second DNA sequence selected from the group consisting of:

- (a) a DNA sequence coding for a protein ~~having~~ comprising SEQ ID NO:2;
- (b) the coding region of SEQ ID NO:1;
- (c) a DNA sequence encoding a protein having amylosucrase activity in the DNA insert of plasmid pNB2 ~~from Neisseria bacteria having deposit number~~ (Deutsche Sammlung von Mikroorganismen (DSM) 9196);
- (d) a DNA sequence coding for a protein encoded by the DNA insert of plasmid pNB2 ~~from Neisseria bacteria having deposit number~~ (DSM 9196);
- (e) a part of any one of the DNA sequences of (a)–(d) coding for a protein having the enzymatic activity of an amylosucrase; and
- (f) a full length complement of the DNA sequence of any one of (a)–(e);
incubating said protein encoded by said first DNA sequence with sucrose under conditions that allow said protein to produce linear α -1,4 glucans; and

isolating the linear α -1,4 glucans.

21. (currently amended): A method of producing fructose comprising using a protein having the enzymatic activity of an amylosucrase that is coded for by a DNA molecule comprising a first DNA sequence encoding said protein, wherein said first DNA sequence is ~~is~~ has more than 60% ~~homologous~~ sequence identity to a second DNA sequence selected from the group consisting of:

- (i) a DNA sequence coding for a protein ~~having~~ comprising SEQ ID NO:2;
 - (ii) the coding region of SEQ ID NO:1;
 - (iii) a DNA sequence encoding a protein having amylosucrase activity in the DNA insert of plasmid pNB2 ~~from Neisseria bacteria having deposit number~~ (DSM 9196);
 - (iv) a DNA sequence coding for a protein encoded by the DNA insert of plasmid pNB2 ~~from Neisseria bacteria having deposit number~~ (DSM 9196);
 - (v) a part of any one of the DNA sequences of (i)–(iv) coding for a protein having the enzymatic activity of an amylosucrase; and
 - (vi) a full length complement of the DNA sequence of any one of (i)–(v);
- incubating said protein encoded by said first DNA sequence with sucrose under conditions that allow said protein to produce fructose; and
- isolating the fructose.

22–32 (canceled)

33. (currently amended): A process for the production of linear α -1,4 glucans, fructose and/or fructose syrup comprising the steps of:

(a) culturing a host cell comprising a protein having the enzymatic activity of an amylosucrase, that is encoded for by a DNA molecule comprising a first DNA sequence encoding said protein, wherein said first DNA sequence ~~is~~has more than 60% ~~homologous sequence identity~~ to a second DNA sequence selected from the group consisting of:

- (i) a DNA sequence coding for a protein ~~having~~comprising SEQ ID NO:2;
- (ii) the coding region of SEQ ID NO:1;
- (iii) a DNA sequence encoding a protein having amylosucrase activity in the DNA insert of plasmid pNB2 ~~from Neisseria bacteria having deposit number (DSM 9196);~~
- (iv) a DNA sequence coding for a protein encoded by the DNA insert of plasmid pNB2 ~~from Neisseria bacteria having deposit number (DSM 9196);~~
- (v) a part of any one of the DNA sequences of (i)–(iv) coding for a protein having the enzymatic activity of an amylosucrase; and
- (vi) a full length complement of the DNA sequence of any one of (i)–(v);

wherein the host cell secretes said protein encoded by said first DNA sequence into a culture medium comprising sucrose under conditions allowing expression and secretion of said protein; and

(b) recovering the produced α -1,4 glucans, fructose and/or fructose syrup from the culture medium.

34. (previously presented) The process according to claim 33, wherein the host cell is immobilized.

35. (currently amended): A process for the production of linear α -1,4 glucans comprising the steps of:

(a) producing an expression cassette comprising the following DNA sequences:

(i) a promoter that is active in plants and ensures formation of an RNA in the respective target tissue or target cells;

(ii) a DNA molecule comprising a first DNA sequence encoding a protein having the enzymatic activity of an amylosucrase, wherein said first DNA sequence is has more than 60% homologous sequence identity to a second DNA sequence selected from the group consisting of:

(1) a DNA sequence coding for a protein ~~having comprising~~ SEQ ID NO:2;

(2) the coding region of SEQ ID NO:1;

(3) a DNA sequence encoding a protein having amylosucrase activity in the DNA insert of plasmid pNB2 ~~from Neisseria bacteria having deposit number (DSM 9196)~~;

(4) a DNA sequence coding for a protein encoded by the DNA insert of plasmid pNB2 ~~from Neisseria bacteria having deposit number (DSM 9196)~~;

(5) a part of any one of the DNA sequences of (1)–(4) coding for a protein having the enzymatic activity of an amylosucrase; and

(6) a full length complement of the DNA sequence of any one of (1)–(5);

wherein said DNA molecule is fused to the promoter in sense orientation; and

(iii) a signal sequence functional in plants for transcription termination and polyadenylation of an RNA molecule fused to said DNA molecule;

(b) transferring the expression cassette into a plant cell;

(c) regenerating a transgenic plant from the transformed plant cell; and

(d) isolating the linear α -1,4 glucans synthesized in the plant from the plant.

36. (previously presented): The process according to claim 35, wherein the expression cassette contains a nucleotide sequence encoding a transit peptide which ensures transport of the protein having the enzymatic activity of an amylosucrase to a vacuole or to an apoplast.

37. (previously presented) The process according to claim 35, wherein the DNA molecule of part (a)(ii) does not contain a signal sequence effecting secretion to the apoplast.

38. (previously presented) The process according to claim 35, wherein the promoter of part (a)(i) ensures the expression of amylosucrase in sucrose storage organs of the plant.

39. (canceled).

40. (currently amended): A process for the production of linear α -1,4 glucans, fructose and/or fructose syrup in vitro comprising the steps of:

(a) contacting a solution comprising sucrose with a protein having the enzymatic activity of an amylosucrase encoded for by a DNA molecule comprising a first DNA sequence encoding said protein, wherein said first DNA sequence ~~is~~has more than 60% ~~homologous-sequence identity~~ to a second DNA sequence selected from the group consisting of:

(i) a DNA sequence coding for a protein ~~having~~comprising SEQ ID NO:2;

(ii) the coding region of SEQ ID NO:1;

(iii) a DNA sequence encoding a protein having amylosucrase activity in the DNA insert of plasmid pNB2 ~~from Neisseria bacteria having deposit number~~ (DSM 9196);

(iv) a DNA sequence coding for a protein encoded by the DNA insert of plasmid pNB2 ~~from Neisseria bacteria having deposit number~~ (DSM 9196);

(v) a part of any one of the DNA sequences of (i)–(iv) coding for a protein having the enzymatic activity of an amylosucrase; and

(vi) a full length complement of the DNA sequence of any one of (i)–(v);

under conditions allowing the conversion of sucrose to α -1,4 glucans and fructose by said protein encoded by the first DNA sequence; and

(b) recovering the produced α -1,4 glucans, fructose and/or fructose syrup from the solution.

41. (previously presented) The process according to claim 40, wherein the protein is immobilized.

42-46. (canceled).

47. (currently amended): A process for the production of linear α -1,4 glucans, fructose and/or fructose syrup comprising the steps of:

(a) culturing a microorganism comprising a protein having the enzymatic activity of an amylosucrase encoded for by a DNA molecule comprising a first DNA sequence encoding said protein, wherein said first DNA sequence ~~is~~has more than 60% ~~homologous sequence identity~~ to a second DNA sequence selected from the group consisting of:

(i) a DNA sequence coding for a protein ~~having~~comprising SEQ ID NO:2;

(ii) the coding region of SEQ ID NO:1;

(iii) a DNA sequence encoding a protein having amylosucrase activity in the DNA insert of plasmid pNB2 ~~from Neisseria bacteria having deposit number~~ (DSM 9196);

(iv) a DNA sequence coding for a protein encoded by the DNA insert of plasmid pNB2 ~~from Neisseria bacteria having deposit number~~ (DSM 9196);

(v) a part of any one of the DNA sequences of (i)–(iv) coding for a protein having the enzymatic activity of an amylosucrase; and

(vi) a full length complement of the DNA sequence of any one of (i)–

(v),

wherein the microorganism secretes said protein encoded by said first DNA sequence into a culture medium comprising sucrose under conditions allowing expression and secretion of said protein; and

(b) recovering the produced α -1,4 glucans, fructose and/or fructose syrup from the culture medium.